FUM-1215CBPH / FUM-2407CBPH

FUM-1230CBPH / FUM-2415CBPH

FUM-1260CBPH / FUM-2430CBPH

Multistage battery charger

User manual

Design Features

- PFC function (except FUM-1215CBPH and FUM-2407CBPH).
- Sleeping mode function.
- Wide input voltage (universal) range operation (except FUM-1215CBPH and FUM-2407CBPH).
- LCD remote control.
- Battery temperature sensor function.
- Tri-LED color indicator for different charge stage.
- Adjustable charging mode switch for different lead-acid battery types.
- Prevent the battery overcharging, and extend the battery life.
- For recovery of the aging (sulfated) battery.

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1. Important safety instructions

WARNING

Before installing and using the charger, read all instructions and cautionary marking on the charger, the batteries and all appropriate sections of this guide.

General safety precautions

Do not expose the charger to rain, snow, spray, or bilge water. To reduce risk of fire hazards, do not cover or obstruct the ventilation openings. Do not install the inverter in a zero-clearance compartment. Overheating may result.

The charger is designed to be permanently connected to your AC and DC electrical systems.

Never use chagers at a location where there is a danger of gas or dust explosions.

Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock or injury to persons.

Do not disassemble the charger. Attempting to service the unit yourself may result in a risk of electric shcok of fire. Internal capacitors remain charged after all power is disconnected.

The charger must be provided with an equipment-grounding conductor connected to the AC input groung.

To reduce the risk of electrical shock, disconnect both AC and DC power from the charger before attempting any maintenance or cleaning or working on any circuits connected to the charger. Turning off controls will not reduce this risk.

Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any.

To avoid a risk of fire and electric shock make sure that existing wiring is in good electrical conditions and the wire size is not undersized. Do not operate the inverter with damage or substandard wiring.

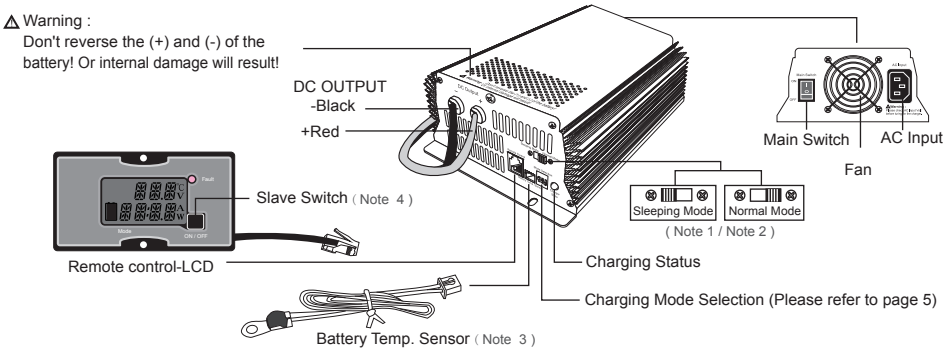
2. Installation location; physical requirements for installation

Condition	Description
Clean	Do not expose the charger to metal filings or any other form of conductive contamination. The presence of conductive contamination can cause damage and void your warranty.
Cool	For best performance, the ambient air temperature should be between -15°C (5°F) and 45°C (113°F) – the cooler the better. At higher ambient temperatures, the output current will be automatically reduced to protect the charger from high internal temperatures.
Dry	The unit is intended for use in a dry location. Do not allow water or other fluids to drip or splash on the charger. Do not mount the charger in an area subject to rain, spray or splashing bilge water.
Safe	This battery charger is Ignition Protected, so it can be installed in areas containing gasoline tanks or fittings which usually require Ignition Protected equipment. It is safest not to install electrical equipment in these areas.

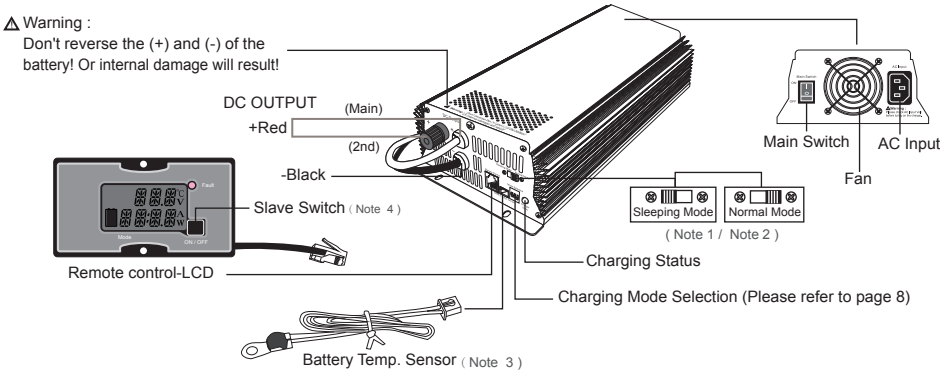
Condition	Description
Ventilated	Allow at least 10 cm (4 inches) of clearance around all sides of the charger for air flow. Ensure that the ventilation openings on the unit are not obstructed. If mounting in a compartment, ventilate the compartment with louvres or cut-outs to prevent overheating.
Close to AC junction box	Avoid the use of extended wire lengths if possible.
Close to batteries	Avoid excessive cable lengths and use the recommended wire lengths and sizes. Undersized or overly long cables may affect charging accuracy.

3. Inverter operation

FUM-1215CBPH; FUM-2407CBPH // FUM-1230CBPH; FUM-2415CBPH



FUM-1260CBPH; FUM-2430CBPH



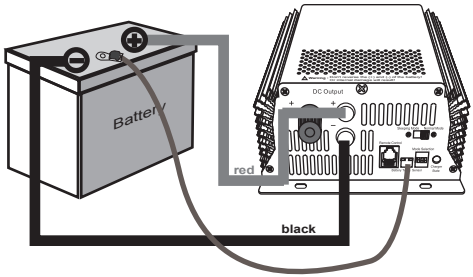
Note 1:

Sleeping mode: Fan would stop and the charger working sound would be smaller, so the output current would be 5A (12V spec.) or 2.5A (24V spec.)

Note 2:

Normal mode: The charger would work as it maximum capacity according to its specifications. Fan would run if it is necessary.

Note 3:

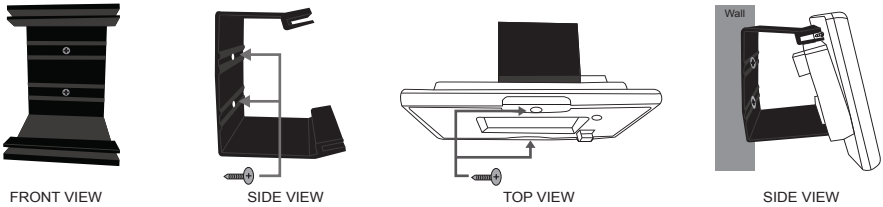


Battery temperature sensor: To detect the battery temperature while charging please connect wire sensor to the battery housing (metal part touches battery housing) by adhesive or tape.

Note 4:

The slave switch of the remote control just cuts out the output. If you want to turn off the charger completely, please switch off main switch of charger body.

Mounting Bracket – optional accessory



FRONT VIEW SIDE VIEW TOP VIEW SIDE VIEW

a. ISOLATED DESIGN

The DC battery charging circuits of this charger are galvanically isolated by a transformer from the AC power circuits. This feature reduces the risk of electric shock.

b. WARNING

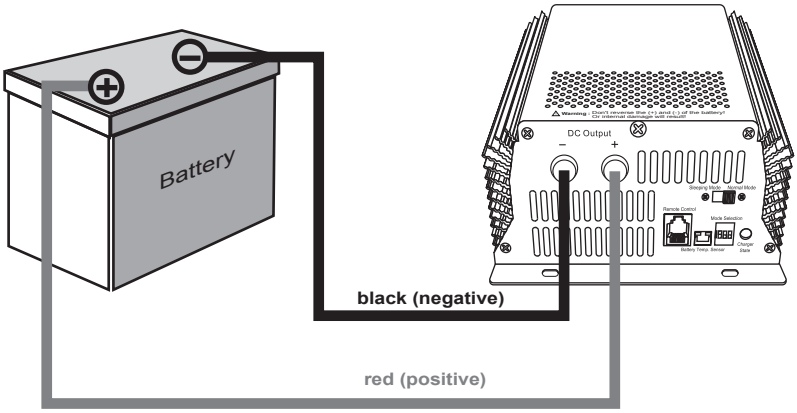
Explosive gases; Prevent flames and sparks; Provide adequate ventilation during charge. Include a warning against recharging non-rechargeable batteries. If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.

c. Explosive gas precautions

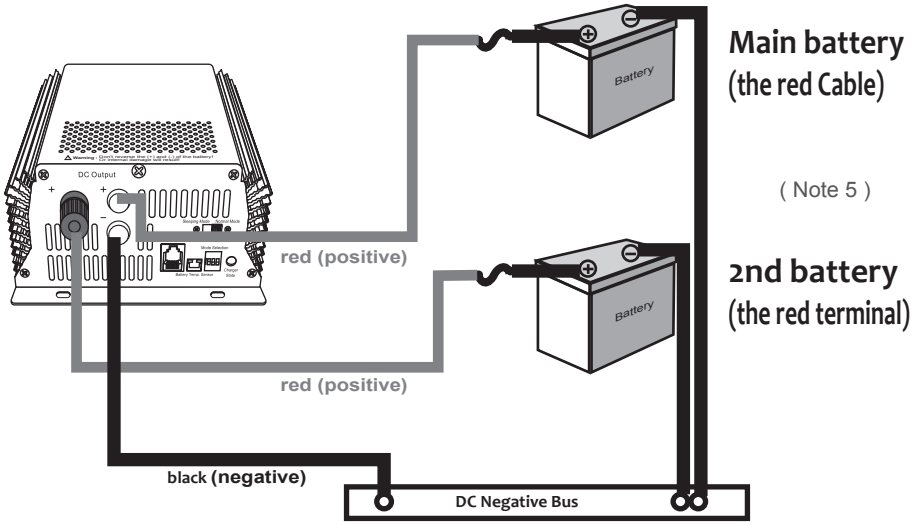
1. The charger have been approved as Ignition Protected. They may be installed in areas containing gasoline tanks and fittings which require Ignition Protected equipment. It is safest not to install electrical equipment in these areas.
2. To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of the equipment in which the battery is installed.

4. Installation diagrams.

Before charging, read the instructions; for indoor use only. Disconnect the supply before making or breaking the connection to the battery.



FUM-1215CBPH; FUM-2407CBPH // FUM-1230CBPH; FUM-2415CBPH

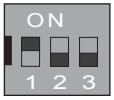
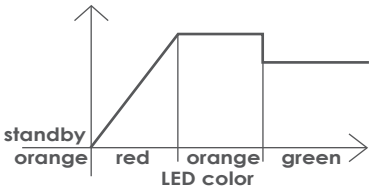
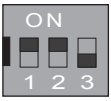
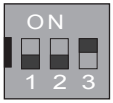
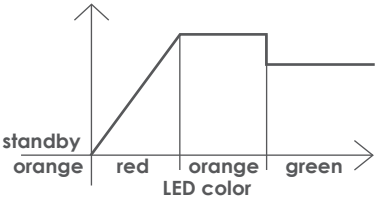
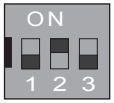
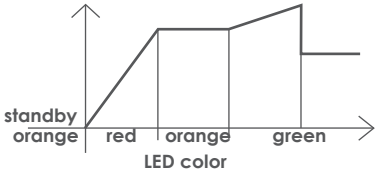
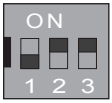
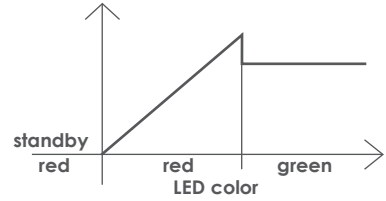
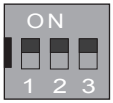
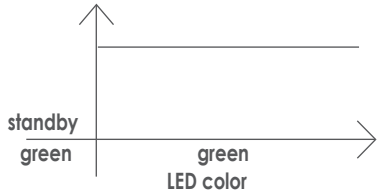
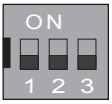


FUM-1260CBPH; FUM-2430CBPH

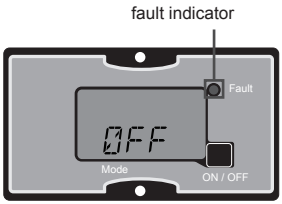
Note 5:

Please connect the main battery cable prior to 2nd battery ternminal if you just have 1 battery.

5. Charging voltage graph

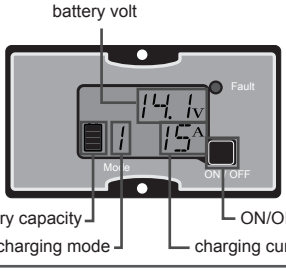
	Mode 1 (100)	Suitable for recharging lead storage battery	
	Mode 2 (120)	Suitable for recharging gel storage battery	
	Mode 3 (003)	Suitable for recharging lead storage battery, which is in good condition (no sulfated situation) and completely disconnected from the devices it runs, because this mode has the additional stage, the battery may reach voltage too high for them. And the limited current delivered by the battery charger. This is not able to provide power for devices, and simultaneously charge the battery.	
	Mode 4 (020)	Suitable for recovery sulfated gel battery, i.e. diacharged batteries unused for long periods or the battery that never recharges completely. This mode should be applied with the battery completely disconnected from the devices it runs.	
	Mode 5 (023)	Suitable for recovery sulfated lead storage battery, i.e. diacharged batteries unused for long periods or the battery that never recharges completely. This mode should be applied with the battery completely disconnected from the devices it runs.	
	Mode 6 (123)	DC power supply 12.2V (for 12V spec.) / 24.5V (for 24V spec)	
	Mode 7 (000)	DC power supply 13.5V (for 12V spec.) / 27V (for 24V spec)	

6. Charger LCD remote control

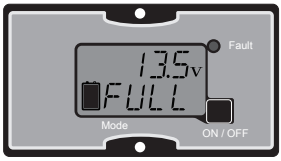


1. OFF

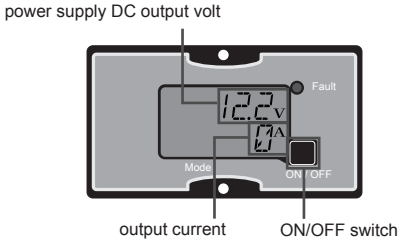
2. Mode 1 ~ 5, no battery connected.



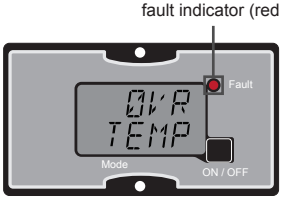
3. Mode 1 ~ 5 while charging.



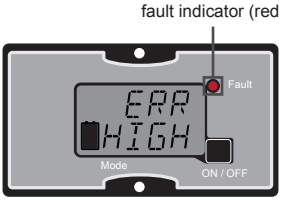
4. Mode 1~ 5, float stage display.



5. Mode 6 ~ 7: power supply mode.



6. Over temperature protection.



7. High battery volt protection.

7. Technical specifications

Model	FUM-1215CBPH							FUM-2407CBPH						
INPUT														
Voltage range	180~264VAC													
Frequency range	45 ~ 65 Hz													
Efficiency	≥ 85%													
Power factor	0.5 at full load (±5%)													
Input socket	IEC plug													
OUTPUT														
Mode selection	M1	M2	M3	M4	M5	M6	M7	M1	M2	M3	M4	M5	M6	M7
Standby	14.7V 1A	14.1V 1A	14.1V 1A	14.1V 1A	15.3V 1A	12.2V 15A	13.5V 15A	29.4V 0.5A	28.2V 0.5A	28.2V 0.5A	28.2V 0.5A	30.6V 0.5A	25.4V 7A	27V 7A
Bulk stage	15.3V 15A			14.1V 1A	15.3V 1A	12.2V 15A	13.5V 15A	30.6V 7A			28.2V 0.5A	30.6V 0.5A	25.4V 7A	27V 7A
Absorption stage (I)	14.7V 15~0A	14.1V 15~0A	14.1V 15~0A	14.1V 1~0A	15.3V 1~0A	12.2V 15A	13.5V 15A	29.4V 7~0A	28.2V 7~0A	28.2V 7~0A	28.2V 0.5~0A	30.6V 0.5~0A	24.5V 7A	27V 7A
Absorption stage (II)	---	---	13.5V 1A max.	---	---	---	---	---	---	30.6V 0.5A max	---	---	---	---
Float stage	13.5V 1A max.					12.2V 15A	13.5V 15A	27V 0.5A max.					24.5V 7A	27V 7A
Max. current	15A							7A						
Continous current	15A							7A						
Recommended battery capacity	45 ~ 150 Ah (12V)					---		30 ~ 90 Ah (24V)					---	
Leakage current from battery	< 1mA					---		< 1mA					---	
Sleeping mode function	Yes, (5A current output only)					---		Yes, (2.5A current output only)					---	
PROTECTION														
Overtemperature	55 ± 5 ºC (131 ± 9 ºF)													
Overload	Yes													
Output short-circuit	Yes													
Microprocessor check	Yes													
ENVIRONMENT														
Working temperature	-15 ~ +45 ºC (5 ~ 113 ºF)													
Working humidity	20 ~ 90 % RH non-condensing													
Storage conditions	-30 ~ +70 ºC (-22 ~ 158 ºF), 10 ~ 95% RH													
Temperature coefficient	± 0.05 %/ºC (0 ~ 50 ºC / 32 ~ 122 ºF)													
OTHER														
Remote control	Yes													
Dimension	213 x 142 x 72 mm (L x W x H)													
Weight	1.9 Kgs.													

Specifications subject to change without notice

Model	FUM-1230CBPH							FUM-2415CBPH						
INPUT														
Voltage range	90~264VAC													
Frequency range	45 ~ 65 Hz													
Efficiency	≥ 85%													
Power factor	1.0 at full load (±5%)													
Input socket	IEC plug													
OUTPUT														
Mode selection	M1	M2	M3	M4	M5	M6	M7	M1	M2	M3	M4	M5	M6	M7
Standby	14.7V 2A	14.1V 2A	14.1V 2A	14.1V 2A	15.3V 2A	12.2V 30A	13.5V 30A	29.4V 1A	28.2V 1A	28.2V 1A	28.2V 1A	30.6V 1A	25.4V 15A	27V 15A
Bulk stage	15.3V 30A			14.1V 2A	15.3V 2A	12.2V 30A	13.5V 30A	30.6V 15A			28.2V 1A	30.6V 1A	25.4V 15A	27V 15A
Absorption stage (I)	14.7V 30~0A	14.1V 30~0A	14.1V 30~0A	14.1V 2~0A	15.3V 2~0A	12.2V 30A	13.5V 30A	29.4V 15~0A	28.2V 15~0A	28.2V 15~0A	28.2V 1~0A	30.6V 1~0A	24.5V 15A	27V 15A
Absorption stage (II)	---	---	13.5V 2A max.	---	---	---	---	---	---	30.6V 1A max	---	---	---	---
Float stage	13.5V 2A max.					12.2V 30A	13.5V 30A	27V 1A max.					24.5V 15A	27V 15A
Max. current	30A							15A						
Continous current	30A							15A						
Recommended battery capacity	75 ~ 250 Ah (12V)					---		45 ~ 150 Ah (24V)					---	
Leakage current from battery	< 1mA					---		< 1mA					---	
Sleeping mode function	Yes, (5A current output only)					---		Yes, (2.5A current output only)					---	
PROTECTION														
Overtemperature	55 ± 5 ºC (131 ± 9 ºF)													
Overload	Yes													
Output short-circuit	Yes													
Microprocessor check	Yes													
ENVIRONMENT														
Working temperature	-15 ~ +45 ºC (5 ~ 113 ºF)													
Working humidity	20 ~ 90 % RH non-condensing													
Storage conditions	-30 ~ +70 ºC (-22 ~ 158 ºF), 10 ~ 95% RH													
Temperature coefficient	± 0.05 %/ºC (0 ~ 50 ºC / 32 ~ 122 ºF)													
OTHER														
Remote control	Yes													
Dimension	252 x 142 x 72 mm (L x W x H)													
Weight	2.5 Kgs.													

Specifications subject to change without notice

Tolerance for specifications: ±0.5V for 12V spec.; ±1V for 24V spec.; ±10% for current data.

Model	FUM-1260CBPH							FUM-2430CBPH						
INPUT														
Voltage range	90~264VAC													
Frequency range	45 ~ 65 Hz													
Efficiency	≥ 85%													
Power factor	1.0 at full load (±5%)													
Input socket	IEC plug													
OUTPUT														
Mode selection	M1	M2	M3	M4	M5	M6	M7	M1	M2	M3	M4	M5	M6	M7
Standby	14.7V 2A	14.1V 2A	14.1V 2A	14.1V 2A	15.3V 2A	12.2V 60A	13.5V 60A	29.4V 1A	28.2V 1A	28.2V 1A	28.2V 1A	30.6V 1A	25.4V 30A	27V 30A
Bulk stage	15.3V 60A			14.1V 2A	15.3V 2A	12.2V 60A	13.5V 60A	30.6V 30A			28.2V 1A	30.6V 1A	25.4V 30A	27V 30A
Absorption stage (I)	14.7V 60~0A	14.1V 60~0A	14.1V 60~0A	14.1V 2~0A	15.3V 2~0A	12.2V 60A	13.5V 60A	29.4V 30~0A	28.2V 30~0A	28.2V 30~0A	28.2V 1~0A	30.6V 1~0A	24.5V 30A	27V 30A
Absorption stage (II)	---	---	13.5V 4A max.	---	---	---	---	---	---	30.6V 1A max	---	---	---	---
Float stage	13.5V 2A max.					12.2V 60A	13.5V 60A	27V 1A max.					24.5V 30A	27V 30A
Max. current	60A							30A						
Continous current	60A							30A						
Recommended battery capacity	180 ~ 600 Ah (12V)					---		90 ~ 300 Ah (24V)					---	
Leakage current from battery	< 1mA					---		< 1mA					---	
Sleeping mode function	Yes, (5A current output only)					---		Yes, (2.5A current output only)					---	
PROTECTION														
Overtemperature	55 ± 5 ºC (131 ± 9 ºF)													
Overload	Yes													
Output short-circuit	Yes													
Microprocessor check	Yes													
ENVIRONMENT														
Working temperature	-15 ~ +45 ºC (5 ~ 113 ºF)													
Working humidity	20 ~ 90 % RH non-condensing													
Storage conditions	-30 ~ +70 ºC (-22 ~ 158 ºF), 10 ~ 95% RH													
Temperature coefficient	± 0.05 %/ºC (0 ~ 50 ºC / 32 ~ 122 ºF)													
OTHER														
Remote control	Yes													
Dimension	335 x 142 x 72 mm (L x W x H)													
Weight	3.5 Kgs.													

Specifications subject to change without notice

Tolerance for specifications: ±0.5V for 12V spec.; ±1V for 24V spec.; ±10% for current data.

8. Charging and discharging formulae

Charging time

Formula: Charging time will depend on the capacity oy your battery and on how deeply is discharged. The following equation calculates an approximate charging time:

$$\text{Charging time} = \frac{\text{CAP x DOD}}{\text{CC x 80\%}}$$

Where:

Charging time: battery recharge time in hours.

CAP: Battery capacity in ampere-hours

DOD: Battery depth of discharge in per cent. A fully discharged battery has a 100% DOD.

CC: Charge current, the rated current output of the charger in amperes

80%: Typical charging efficiency fo lead-acid batteries.

Example: A group size battery rated at 100 amp-hours is 40% discarged, that is it has a DOD = 40. Carging time with a FUM-1215CBPH is calculated as follows:

$$\text{Charging time} = \frac{\text{100Ah x 40\%}}{\text{15A x 80\%}} = 3.3 \text{ hours}$$

Discharging time

To achieve 50% cycling you should calculate your amp-hour consumption between charging cycles and use a battery bank with twice that capoacity. To calculate Amp-hour consumption, fisrt look at the rating plate on your AC appliance or tools.

Each appliance or toll will be rated in either AC amps or AC watt or AC VA(volt-amperes) apparent power.

Use one of the following to calculate the DC amp-hour draw for a 12V system.

(AC amps x 10 if mains is 120VAC) x 1.1 x hours of operation = DC amp-hours.

(AC amps x 19.1 if mains is 230VAC) x 1.1 x hours of operation = DC amp-hours.

(AC watts/12) x 1.1 x hours of operation = DC amp-hours.

(AC VA/12) x 1.1 x hours of operation = DC amp-hours.

In all formulas, 1.1 is the factor for inverter/charger efficiency.

Calculate the above for every AC appliance or tool you intend to use on your inverter. This will give you the total number of amp-hours used between recharges. Size your battery bank using this number as a guideline. A good rule to follow is to size the battery bank about two times mlarger than your total amp-hour load requirement. Plan on recharging when 50% discharged. Many electrical motors have momentary starting requirements weel above their operational rating. Strt up watts are listed where apprpiate. Individual styles and brands of appliance may vary.

NOTICE: Lead-acid battery is recommended for inverter/charger models, also the $LiFePO_4$ batteries.

9. Warranty

We offer 12 months warranty from the date of purchase, as stated in invoice or purchasing proof, and will repair or replace any defective power invertir.

This limited warranty is void if the unit is abused, modified, installed improperly, if the housing has been removed, if the serial number is missing, or if the original identification markings have been defaced, altered, or removed

The supplier is not liable for any incidental, consequential or other damages arising from the use, cost of removal, installation, or troubleshooting of the customer's electrical systems. Repair or replacement are your sole remedies and shall not be liable for damages, whether direct, incidental, special or consequential, even though cause by negligence or other fault.

This is only warranty and the company makes no other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

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